
**Liquid detergents — Hand dishwashing and light duty —
Specification**



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ARSO Central Secretariat
International House 3rd Floor
P. O. Box 57363 — 00200 City Square
NAIROBI, KENYA

Tel. +254-20-2224561, +254-20-3311641, +254-20-3311608

E-mail: arso@arso-oran.org

Web: www.arso-oran.org

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ARSO Central Secretariat
International House 3rd Floor
P.O. Box 57363 — 00200 City Square
NAIROBI, KENYA

Tel: +254-20-2224561, +254-20-3311641, +254-20-3311608

E-mail: arso@arso-oran.org
Web: www.arso-oran.org

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Liquid detergents — Hand dishwashing and light duty — Specification

1 Scope

This African Standard specifies the requirements of liquid detergents for use in soft or hard water for hand dishwashing and for the cleaning of hard surfaces such as painted surfaces, floors, ceilings, ceramic and plastics tiles, and the surfaces of equipment.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2271, *Surface active agents — Detergents — Determination of anionic-active matter by manual or mechanical direct two-phase titration procedure*

CD-ARS 1466:2017, *General purpose detergent (beads, granules and powders)*

ISO 10523, *Water quality — Determination of pH*

EN 1676, *Aluminium and aluminium alloys — Alloyed ingots for remelting — Specifications*

3 Definitions and abbreviations

For the purpose of this standard the following definitions apply.

3.1 acceptable

acceptable to the authority administering this standard, or to the parties concluding the purchase contract, as relevant

3.2 batch

material from a single mix or, in the case of a continuous production process, the material from a single day's production

3.3 defective

detergent or a container that fails in one or more respects to comply with the relevant requirements of this standard

3.4 lot

quantity of detergent bearing the same batch identification, from one manufacturer, and submitted at any one time for inspection and testing

4 Requirements

4.1 General

4.1.1 The detergent shall be a uniform aqueous solution, which, if so required, may be coloured. It shall be free from abrasives and organic solvents, and shall remain homogeneous during storage at ambient temperature.

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4.1.2 It shall not be irritating to the normal skin and shall not contain any ingredients in a quantity that is toxic to human beings.

4.2 Consistency

On being cooled to $4.5\text{ }^{\circ}\text{C} \pm 0.5\text{ }^{\circ}\text{C}$ for 24 h, the detergent shall show no separation and shall remain liquid.

4.3 Odour

4.3.1 When so required, the detergent shall be perfumed. The detergent and a solution of the detergent in water at $60\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ shall have an acceptable odour.

4.3.2 During storage at ambient temperature, the odour of the detergent shall remain such as to be acceptable, and when perfumed, the fragrance shall not change.

4.5 Insoluble matter

When determined in accordance with 6.5, the insoluble matter content shall not exceed a mass fraction of 0.50 %.

4.6 pH Value

The pH value of a volume fraction of 1.00 % solution of the detergent, when determined in accordance with 6.6, shall be not less than 6.0 and not more than 9.0.

4.7 Rinsing properties

When tested in accordance with 6.7, the detergent shall be free-rinsing.

4.8 Cleaning efficiency

When tested in accordance with 6.8, the cleaning efficiency of liquid hand dishwashing and light duty detergent shall be at least 80 % of that of the standard detergent.

4.9 Stability

The detergent shall, remain stable up to its best before date in the original container under normal storage conditions, still comply with all the requirements of this standard.

5 Sampling and compliance with the standard

5.1 Sampling

The following sampling procedure shall be applied in determining whether a lot that was submitted for inspection and testing, complies with the relevant requirements of this standard. The sample so drawn shall be deemed to represent the lot.

5.1.1 Sample for inspection

Draw at random from the lot

- a) five containers, if the lot is packed in containers of net volume not exceeding 5 L, or
- b) three containers, if the lot is packed in containers of net volume exceeding 5 L.

5.1.2 Sample for testing

5.1.2.1 From the containers taken in accordance with 5.1.1 draw enough detergent to provide a composite test sample of total volume at least 1 L, taking equal quantities of detergent from all containers.

5.1.2.2 Before drawing a sample thoroughly mix the contents of the relevant container.

5.1.2.3 Pour the samples into a clean, dry, air-tight glass or plastics bottle clearly marked with the manufacturer's name or trademark, the batch identification and the date of sampling.

5.2 Compliance with the standard

Deem the lot to comply with the requirements of the standard if, after inspection and testing of the samples taken in accordance with 5.1.1 and 5.1.2, the samples are found to comply with all the requirements of the standard and no defects are found.

6 Inspection and methods of test

6.1 General

All reagents used shall be of analytical reagent grade, and all water shall be distilled or deionized water.

6.2 Inspection

Inspect the containers taken in accordance with 5.1.1 for compliance with the requirements of clause 7.

6.3 Test samples

Carry out determinations of the consistency, odour,, insoluble matter, pH value, rinsing properties and cleaning efficiency on the composite test sample taken in accordance with 5.1.2.

6.4 Standard hard water

Dissolve 3.520 g of chemically pure calcium chloride ($\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$) and 3.947 g of chemically pure magnesium sulfate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) in distilled water and dilute to 20 L with distilled water. (This standard hard water has a hardness of approximately 200 mg/L calculated as calcium carbonate).

6.5 Insoluble matter

6.5.1 Procedure

6.5.1.1 Accurately weigh (to ± 0.001 g) approximately 5 g of the test sample (see 6.3) into a beaker and add 250 mL of the standard hard water (see 6.4).

6.5.1.2 Heat on a steam bath, with frequent stirring, until the sample is completely dispersed.

6.5.1.3 Filter the solution immediately, under suction, through a dried and tared Whatman GF/A glass-fibre filter paper or equivalent and ensure that the insoluble matter is quantitatively transferred to the filter.

6.5.1.4 Wash the beaker and the residue five times with 20 mL portions of hot standard hard water.

6.5.1.5 Allow the solution to drain completely and dry the residue at 105 °C until a constant mass is attained.

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6.5.2 Calculation

Calculate the insoluble matter content S as a percentage by mass, as follows:

$$S = \frac{m_2}{m_1} \times 100$$

where

S is the insoluble matter content as a percentage by mass;

m_1 is the mass of the test sample taken, expressed in grams (g); and

m_2 is the mass of the insoluble matter after it has been dried, expressed in grams (g).

Check for compliance with 4.5.

6.6 pH value

Dissolve 1.0 mL of the test sample in 100 mL of carbon-dioxide-free distilled or deionized water and determine its pH value, using ISO 10523. Check for compliance with 4.6.

6.7 Rinsing properties

6.7.1 Accurately weigh (to ± 0.001 g) approximately 0.4 g of the test sample (see 6.3) into a thoroughly cleaned 500 mL conical flask and add 200 mL of the standard hard water (see 6.4).

6.7.2 Stopper the flask and shake it vigorously for 1 min.

6.7.3 Pour out the solution and rinse the flask by adding 200 mL of the standard hard water, shaking vigorously for 1 min and pouring off the water.

6.7.4 Invert the flask and allow to dry.

6.7.5 Carry out a blank by repeating the above procedure but omitting the test sample.

6.7.6 Compare the two flasks.

6.7.7 Consider the detergent to comply with 4.7 if the streaks and marks on the flask used for the test do not exceed those on the flask used for the blank.

6.8 Cleaning efficiency

6.8.1 Apparatus

6.8.1.1 Six test panels of anodized aluminium, machined from aluminium that complies with EN 1676 (alloy designation Al-99,5A: alloy code number SA2). The panels are of the dimensions given in figure 1 and have indentations as shown in figure 1.

6.8.1.2 Six suitable clamps, so fitted to the stirrers (see 6.8.1.3) as to allow the panels to be gripped and rotated about a vertical axis.

6.8.1.3 Six mechanical stirrers, capable, when supporting the test panels, of operating smoothly and continuously at 60 r/min to 62 r/min.

6.8.1.4 Water-bath, that is thermostatically controlled, is capable of maintaining a temperature of $21 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$, and is fitted with a cover that has a row of six holes to accommodate the test beakers (see 6.8.1.5).

6.8.1.5 Six beakers, of capacity 800 mL, of internal diameter approximately 90 mm and of height approximately 135 mm.

6.8.1.6 Six flat-bottom glass crystallizing basins, of capacity 175 mL, of diameter approximately 80 mm and of height approximately 40 mm, to hold the six test panels.

6.8.1.7 Six tall-form beakers, of capacity 150 mL.

6.8.1.8 Spatula, fitted with a flexible straight-edge steel blade.

6.8.1.9 Watch glasses

6.8.2 Materials

6.8.2.1 Standard hard water (see 6.4)

6.8.2.2 Standard detergent, a solution containing a mass fraction of 4.0 % sodium lauryl ether sulphate (SLES) and a mass fraction of 16,0 % sodium dodecyl benzene sulphonate (SDBS) at a pH of 7.5 ± 1 that is prepared as follows:

- a) Determine the anionic content of the sodium lauryl ether sulphate (SLES) in accordance with ISO 2271, using 442 g for 3 moles ethylene oxide or 384 g for 2 moles ethylene oxide as the molecular mass in the calculation;
- b) Determine the anionic content of the sodium dodecyl benzene sulphonate (SDBS) in accordance with ISO 2271, using 340 g as the molecular mass or the molecular mass as supplied by the manufacturer;
- c) Measure a calculated amount of the SLES (see 6.8.2.2 (a)) to give a mass fraction of an active content of 4,0 % and a calculated amount of SDBS (see 6.8.2.2 (b)) to give a mass fraction of an active content of 16,0%;
- d) Add water to give a combined mass of 100,0 g;
- e) Mix the solution thoroughly and adjust it if necessary to a pH of 7.5 ± 1 , using 4g/L of sodium hydroxide or 10 g/L citric acid.

6.8.2.3 Artificial soil, comprising an intimate mixture of the following ingredients:

- a) 85.0 % margarine;
- b) 10.0 % egg-powder; and
- c) 5.0 % cornflour.

6.8.3 Procedure

6.8.3.1 Accurately weigh 15.0 g of the standard detergent into each of three beakers, and 15.0 g of the test sample into each of the other three beakers.

6.8.3.2 Add 750 mL of the standard hard water to each beaker and so place the beakers in the water-bath, maintained at $21 \text{ }^{\circ}\text{C} \pm 2 \text{ }^{\circ}\text{C}$, that the three beakers containing the standard detergent are in the first, third and fifth holes and the three beakers containing the test sample are in the remaining holes. Cover the beakers with watch glasses.

6.8.3.3 Thoroughly clean the test panels with a suitable detergent (e.g. 1 % solution of detergent that complies with **CD-ARS 1466:2018**, dissolved in hot water), and allow to air dry.

6.8.3.4 Place each panel in its glass crystallizing basin, clearly identify the panel-and-basin combination, and place the basins and panels into an oven at $105 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$ for 1 h. Remove the basins and panels from the oven and, after allowing them to cool in a desiccator, determine the mass of each glass basin together with its panel.

6.8.3.5 Homogenize the artificial soil by mixing it with the spatula.

6.8.3.6 Use the spatula to pack each panel with approximately 1.3 g of the homogenized soil, ensuring that the mass of each panel does not differ by more than 0.1 g from the mass of any of the other panels and that the exposed surfaces of the soil are smooth and flat. When the packed panels are inspected, no pin holes, air bubbles or other inclusions shall be visible.

6.8.3.7 When each panel has been packed with soil, place it in its glass crystallizing basin and determine the mass of each glass basin together with its panel. To condition the soil, refrigerate it at $4.5\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for 15 min.

NOTE The portion of the panel containing the soil should not be touched during the procedure.

6.8.3.8 Remove the glass basins containing the soiled panels from the refrigerator and so fit the panel into the clamp of the stirrer (see 6.8.1.2) that the jaws of the clamp are positioned at the end of the panel above the soiled areas. So adjust the panel that it is vertical.

6.8.3.9 Lower a panel assembly carefully into the centre of each of the six beakers containing 750 mL of detergent solution maintained at $21\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, until the solution level just reaches the marked line above the soiled area (see Figure 1).

6.8.3.10 Allow the refrigerated soiled panels to stand for 15 min in the test solution before stirring the solution for 60 min at 60 to 62 r/min. Remove each panel in turn from the detergent solution, and temporarily place the panel in a vertical position in an empty 150 mL tall-form beaker.

6.8.3.11 Remove any traces of emulsified soil on the flat surfaces of the panels by using absorbent paper e.g. toilet paper taking care that the soil in the indentations of the panels is not touched. Remove any traces of emulsified soil on the flat surfaces between the indentations of the panels, by scraping the flat surfaces with a straight-edge spatula.

6.8.3.12 Place each panel in its glass crystallizing basin, clearly identify the panel-and-basin combination, and place the basins and panels into an oven at $105\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ for 3 h. Remove the basins and panels from the oven and, after allowing the basins and panels to cool in a desiccator, determine the mass of each glass basin together with its panel.

6.8.4 Calculation

6.8.4.1 Calculate the cleaning efficiency C (as a percentage by mass) of each test sample and of each portion of standard detergent, as follows:

$$C = \frac{m_2 - m_3}{m_2 - m_1} \times 100$$

where

m_1 is the mass of the panel and glass basin, expressed in grams (g);

m_2 is the initial mass of the panel, soil and glass basin, expressed in grams (g); and

m_3 is the final mass of the panel, soil and glass basin, expressed in grams (g).

6.8.4.2 Calculate the mean cleaning efficiency of the test samples and of the standard detergent samples, subject to the following conditions:

- use all three results (calculated as in 6.8.4.1) to calculate a mean if no two results exceed three percentage points difference, or
- use any two results (calculated as in 6.8.4.1) that do not exceed three percentage points difference to calculate the mean, or

- c) if the individual results (calculated as in 6.8.4.1) do not conform to (a) or (b) above, discard all the results and repeat the test.

Check for compliance with 4.8.

7 Packing and labelling

7.1 Packing

The detergent shall be packed in containers that are strong enough to withstand normal handling and transportation and that will prevent leakage and contamination of the product. These containers may then be packed in bulk packages. Only detergent from the same batch shall be packed in any one container and, when relevant, in any one bulk package.

7.2 Labelling

Each container and each bulk package shall bear in prominent, legible and indelible marking with the following information:

- a) the manufacturer's name or trademark or both;
- b) words indicating that the product is a hand dishwashing or liquid light duty detergent ;
- c) general instructions for use that are suitable for the purposes specified;
- d) the batch identification (which may be given in code);
- e) the volume of the contents;
- f) in the case of bulk packages, the quantity of containers;
- g) best before date and

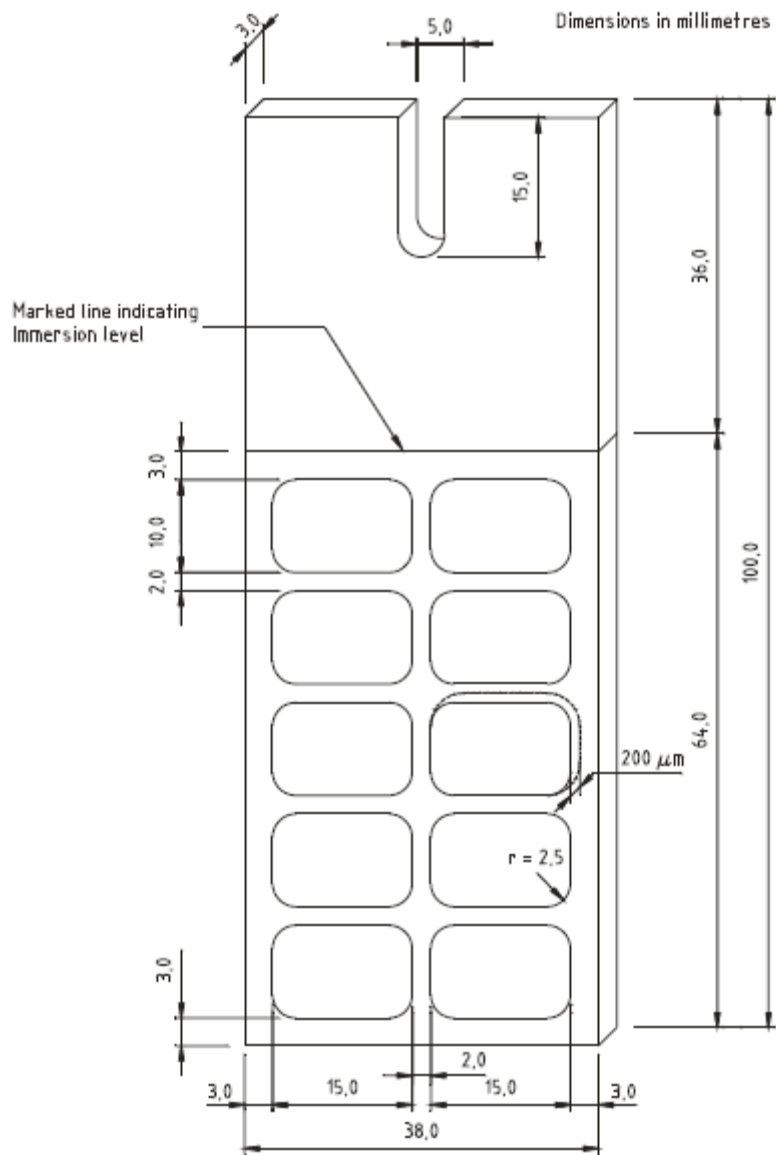


Figure 1 — Aluminium test panel

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Standard

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